

Chemistry I: Solving Molality Problems

The formulae for molality problems are:

$$m = \frac{\left(\frac{\# g}{mm} \right)}{kg} \quad \text{or} \quad m = \frac{mol.}{kg}$$

There are 3 types of problems:

1. the simplest type:

- a. What is the molality of a solution that has 3 moles of KCl in 5000 g of water?

b.
$$m = \frac{3molKCl}{5kg} = 0.6mKCl$$

2. to calculate the number of grams of solute to make a solution of known molal concentration

- a. How many grams of NaOH are needed to make a 2.5 m solution with 1500 grams of water?

b.
$$2.5m = \frac{\left(\frac{x}{40g} \right)}{1.5kg} = 159gNaOH$$

3. To calculate the molality of a solution given the amount of compound and the mass of water?

- a. What is the molality (m) of a solution that contains 270 grams of $MgSO_4$ in 3000 grams of water?

b.
$$m = \frac{\left(\frac{270g}{120g} \right)}{3kg} = 0.75mMgSO_4$$